EMPIRICAL RESEARCH QUANTITATIVE

Prevalence and reasons for self-medication for prevention of COVID-19 among the adult population in Kermanshah-Iran

Maryam Janatolmakan[1] | Armin Naghipour[1] | Alireza Khatony[1,2]

[1]Social Development and Health Promotion Research Center, Health Institute, Kermanshah University of Medical Sciences, Kermanshah, Iran

[2]Infectious Diseases Research Center, Kermanshah University of Medical Sciences, Kermanshah, Iran

Correspondence
Alireza Khatony, Social Development and Health Promotion Research Center, Health Institute, Kermanshah University of Medical Sciences, Kermanshah, Iran.
Email: akhatony@gmail.com

Abstract

Aim: To determine the prevalence of self-medication and reasons for self-medication (SM) for the prevention/treatment of COVID-19 among the adult population.

Design: Cross-sectional study.

Methods: This study was performed on 147 adults in Kermanshah, Iran. Data were collected by a researcher-made questionnaire and analysed by SPSS-18 software using descriptive and inferential statistics.

Results: The prevalence of SM in the participants was 69.4%. Vitamin D and vitamin B complex were the most commonly used drugs. The most common symptoms leading to SM were fatigue and rhinitis. Strengthening the immune system and prevention of COVID-19 (48%) were the main reasons for SM. Factors related to SM included marital status [OR = 8.04, 95% CI = (3.62, 17.83)], education [OR = 0.16, 95%CI = (0.08, 0.35)] and monthly income [OR = 0.09, 95%CI = (0.03, 0.26)].

Patient or Public Contribution: Yes

KEYWORDS
COVID-19, prevalence, prevention, self-medication, treatment

1 | BACKGROUND

COVID-19 has spread worldwide since December 2019 (Sahin et al., 2020). The disease is spreading so fast that fear and anxiety are increasing day by day among the people (Pakpour & Griffiths, 2020; Ruiz-Aquino et al., 2022; Yan et al., 2021; Yáñez et al., 2020; Zhang et al., 2018). Lack of definitive treatment (Román et al., 2020), high incidence rates and rising mortality rates have led to the arbitrary use of drugs such as vitamins, antibiotics and analgesics for self-care (Pakpour & Griffiths, 2020; Quispe-Cañari et al., 2021). Arbitrary use of various drugs has created a great challenge for countries (Behroozpour et al., 2016; Cecyli & Pragathi, 2020; Rezaei Jaberee et al., 2020) and has imposed a heavy cost on their health and economic systems (Jalilian et al., 2013; Kumar et al., 2021). Statistics show that the prevalence of self-medication (SM) for the prevention/ treatment of COVID-19 is increasing (Cecyli & Pragathi, 2020; Liu et al., 2020; Nasir et al., 2020; Okunola, 2020).

Arbitrary use of drugs can cause side effects such as drug resistance, drug interactions, mistreatment, concealment of severe symptoms and damage to vital organs such as the kidneys and liver (Nandita et al., 2021; Quispe-Cañari et al., 2021). The prevalence of SM for COVID-19 has been reported to be 60.4%–88.3% (Nasir et al., 2020; Niroomand et al., 2020; Onchonga et al., 2020). The most commonly used drugs for the prevention /treatment of COVID-19 include vitamins (C and D), antibiotics (azithromycin and penicillin) and analgesics (acetaminophen) (Mudenda et al., 2020; Nasir et al., 2020; Osaigbovo et al., 2021; Quispe-Cañari et al., 2021). The most common symptoms leading to SM include colds, headaches and lack of time to see a doctor (Ayalew, 2017; Esan et al., 2018; Niroomand et al., 2020).

Therefore, due to the destructive effects of SM, the present study was conducted to determine the prevalence and reasons for SM for the prevention/treatment of COVID-19 among the adult population in Kermanshah, Iran. This study sought to answer the following questions:

- What is the prevalence of and reasons for SM among the adult population in Kermanshah, Iran during the COVID-19 epidemic?
- What are the clinical signs that lead to SM?
- What are the determinants of SM?

2 | METHODS

2.1 | Study design

This study is a descriptive-analytical cross-sectional research. Hence, it is not possible to determine the causal relationship between the variables. The results of the study were expressed based on the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines (Cuschieri, 2019).

2.2 | Sample and sampling method

The study population included the adult population in Kermanshah, Iran. The city of Kermanshah is the capital of Kermanshah province and according to the census of 2016, it has a population of about 950,000 people (Janatolmakan et al., 2022). Using the study of Kombaté et al. (2017) (OR = 1.7, α = 0.05, Power = 0.80) and the logistic regression sample size formula in G-Power v 3.1.9.2 software, the sample size was estimated to be 147 people (Kombaté et al., 2017). Samples were selected by convenience sampling method. The inclusion criteria were age over 18 years, willingness to participate in the study and having literacy.

2.3 | Instruments

Data collection tools included a demographic questionnaire and a researcher-made questionnaire. The demographic questionnaire included seven items about age, gender, marital status, education, occupation, residence and monthly income.

The researcher-made questionnaire had three parts. The first part contained 20 questions about the drugs used. The second and third sections, with 16 and 21 yes/no questions, respectively, were dedicated to the reasons for and symptoms of SM. To determine the validity of the questionnaire, the content validity method was used. For this purpose, the questionnaire was provided to 20 faculty members in the departments of infectious diseases and pharmacology, and their opinions were included in the questionnaire (content validity index: 0.86, content validity ratio: 0.70). The internal consistency of the instrument was determined by Cronbach's alpha method, which was calculated to be 80%.

The first part of the questionnaire included questions about medications such as vitamins (C, D, multivitamins, B complex), antibiotics (azithromycin, amoxicillin) and anti-inflammatory drugs (dexamethasone, betamethasone). The second part included questions about the clinical signs and symptoms leading to SM, such as rhinitis, dry cough, headache, fever and chills, and loss of taste and smell. The third part of the questionnaire was dedicated to reasons for SM, including boosting the immune system, fear of getting COVID-19, prevention of COVID-19, contact with people suspected of COVID-19 and death of relatives or acquaintances due to COVID-19.

2.4 | Data collection

To collect data, the researcher referred to different areas of Kermanshah, such as parks, pharmacies and shopping centres, and selected those who were willing to participate in the study. First, the objectives of the study were explained to the participants, and if they were willing to participate in the study, the questionnaires were provided to them. The questionnaires were collected after completion.

2.5 | Data analysis

Data were analysed by SPSS-18 software using descriptive and inferential statistics. In the descriptive statistics section, frequency, mean and standard deviation were used. In the inferential statistics section, the simple and multiple regression models were fitted to determine the odds of SM based on demographic variables. The significance level was considered <0.05 for all tests.

2.6 | Ethical considerations

The ethics committee of Kermanshah University of Medical Sciences approved the study, with the code IR.KUMS.REC.1399.850. The objectives of the study were explained to all participants, and informed written consent was obtained from them. The participants were reassured about the confidentiality of their personal information and details.

3 | RESULTS

The samples included 147 people with a mean age of 39.5 ± 1.1 years. Most of them were men (n = 99, 64.7%), below 40 years of age (n = 92, 62.5%), self-employed (n = 80, 54.4%) and had a monthly income of less than $ 600 (n = 60, 40.8%). Moreover, 66.7% (n = 98) reported a family history of COVID-19. Further, 31.6% (n = 45) reported a history of COVID-19 over the past 9 months (Table 1).

TABLE 1 Demographic characteristics of the participants (n = 147)

Variables	Total number (n = 147)	Doing self-medication	
		No, n (%) (n = 45)	Yes, n (%) (n = 102)
Age (years)			
≤40	92 (62.6)	33 (35.9)	59 (63.1)
>40	55 (37.4)	12 (21.8)	43 (78.2)
Sex			
Female	48 (32.6)	16 (33.3)	32 (66.7)
Male	99 (67.4)	29 (29.3)	70 (70.7)
Marital status			
Single	59 (40.1)	33 (55.9)	26 (44.1)
Married	88 (59.9)	12 (13.6)	76 (86.4)
Education			
High school	89 (60.5)	14 (15.7)	75 (84.3)
College	58 (39.5)	31 (53.4)	27 (46.5)
Occupation			
Unemployed	14 (9.5)	4 (28.6)	10 (71.4)
Self-employed	80 (54.4)	23 (28.8)	57 (71.2)
Employee	53 (36.1)	18 (34.0)	35 (66.0)
Residence			
Urban	127 (86.4)	41 (32.3)	86 (67.7)
Rural	20 (13.6)	4 (20.0)	16 (80.0)
Monthly income, in dollars			
<600	60 (40.8)	9 (15.0)	51 (85.0)
600–1200	53 (36.1)	14 (26.4)	39 (73.6)
>1200	34 (23.1)	22 (64.7)	12 (35.3)

TABLE 2 Frequency of symptoms leading to self-medication among the adult population (n = 102)

Variables	n (%)
Sore throat	
Yes	42 (41.2)
No	60 (58.8)
Diarrhoea	
Yes	14 (13.8)
No	88 (86.2)
Joint and muscle pain	
Yes	49 (48.0)
No	53 (52.0)
Loss of taste	
Yes	25 (24.5)
No	77 (75.5)
Loss of smell	
Yes	30 (29.4)
No	72 (70.6)
Dry cough	
Yes	37 (36.3)
No	65 (63.7)
Dyspnoea	
Yes	35 (34.3)
No	67 (65.7)
Rhinitis	
Yes	51 (50.0)
No	51 (50.0)
Stomach ache	
Yes	27 (26.5)
No	75 (73.5)
Anorexia	
Yes	21 (20.6)
No	81 (79.4)
Nausea and vomiting	
Yes	19 (18.6)
No	83 (81.4)
Headache	
Yes	44 (43.1)
No	58 (56.9)
Fever/chills	
Yes	33 (32.4)
No	69 (67.6)
Nasal congestion	
Yes	20 (19.6)
No	82 (80.4)
Sneezing	
Yes	26 (25.5)
No	76 (74.5)

The prevalence of SM was 69.4% (n = 102). From the group of vitamins, the most frequently used vitamins were C (59.1%, n = 87), D (59.1%, n = 87) and B complex (38.8%, n = 57). Dexamethasone and betamethasone were the most common anti-inflammatory drugs (15.6% n = 23) that were taken arbitrarily. The most common antibiotics used were azithromycin (26.5% n = 39) and penicillin (14.9% n = 22).

The most common clinical symptoms that led to SM included weakness and fatigue (51.9% n = 53), rhinitis (50.0% n = 51), sore throat (48.0%, n = 49) and headache (43.1%, n = 44; Table 2).

The most important reasons for SM were boosting the immune system (67.6% n = 69), prevention of COVID-19 (48.0%, n = 49) and prevention of influenza (48.0% n = 49) respectively (Table 3).

The results showed that 42.2% of participants (n = 62) purchased drugs from pharmacies based on their previous knowledge. Further, 38.2% (n = 39) stated that some of their symptoms were improved following SM, and 93.1% (n = 95) reported that they did not develop any complications due to SM.

Regarding the factors related to SM, the results showed that SM was 1.69 times more prevalent in men than in women [OR = 1.69, 95% CI = (0.54, 5.35)]. The participants above the age of 40 years

TABLE 2 (Continued)

Variables	n (%)
Weakness and fatigue	
Yes	53 (52.0)
No	49 (48.0)

TABLE 3 Reasons for self-medication (n = 102)

Reasons	n (%)
Strengthening the immune system	
Yes	69 (67.7)
No	33 (32.3)
Treatment of colds/flu	
Yes	49 (48.0)
No	53 (52.0)
Prevention of COVID-19	
Yes	49 (48.0)
No	53 (52.0)
Fear of getting COVID-19	
Yes	34 (33.3)
No	68 (66.7)
Fear of re-infection with Covid-19	
Yes	20 (19.6)
No	82 (80.4)
Death of relatives or acquaintances due to COVID-19	
Yes	13 (12.8)
No	89 (87.2)
Direct contact with persons with COVID-19	
Yes	21 (20.6)
No	81 (79.4)
Treatment of possible symptoms of COVID-19	
Yes	15 (14.7)
No	87 (85.3)
Fear of hospitalization	
Yes	36 (35.3)
No	66 (64.7)
Fear of being quarantined	
Yes	34 (33.3)
No	68 (66.7)
Unavailability of COVID-19 treatment in the hospital	
Yes	6 (5.9)
No	96 (94.1)
Crowded medical centres	
Yes	6 (5.9)
No	96 (94.1)
Having information in the field of pharmacology	
Yes	10 (9.8)
No	92 (90.2)

TABLE 3 (Continued)

Reasons	n (%)
Pressure from family members and friends	
Yes	8 (7.8)
No	94 (32.2)
Existence of healthcare workers among family members and friends	
Yes	5 (4.9)
No	97 (95.1)
Pharmaceutical advertising in mass media	
Yes	10 (9.8)
No	92 (90.2)
Inadequate quality of hospital care	
Yes	36 (35.3)
No	66 (64.7)
High costs of treatment	
Yes	38 (37.3)
No	64 (62.7)
Lack of access to a doctor	
Yes	25 (24.5)
No	77 (75.5)
Being away from medical centres	
Yes	26 (25.5)
No	76 (74.5)
Not having enough time to see a doctor	
Yes	19 (18.6)
No	83 (81.4)

were 0.89 times more likely to self-medicate than those below the age of 40 years. SM was 7.16 times more prevalent in the married participants than in the single ones [OR = 7.16, 95% CI = (2.61, 16.63)]. The participants with a monthly income of $ 1200 were 0.09 times more likely to self-medicate [OR = 0.09, 95% CI = (0.02, 0.29)] (Table 4).

4 | DISCUSSION

This study aimed to determine the prevalence of and reasons for SM for the prevention/treatment of COVID-19 among the adult population in Kermanshah, Iran. The results showed that the prevalence of SM for COVID-19 was 69.4%, which is relatively high. This finding is consistent with the results of previous studies (Hoffmann et al., 2014; Nasir et al., 2020; Onchonga et al., 2020). Reasons for the relatively high prevalence of SM include the unknown nature of COVID-19, fear of getting COVID-19, disregarding the consequences of SM, contact with people suspected of having COVID-19 and death of relatives due to COVID-19.

In the present study, the most commonly used medications included antibiotics, analgesics and vitamins, which is in line with the

Variable	Not adjusted		Adjusted	
	OR (95% CI)	P-value	OR (95%CI)	p-value
Age (years)				
≤40	1	0.076	1	0.846
>40	2.00 (0.93, 4.32)		0.89 (0.29,2.78)	
Sex				
Female	1	0.618	1	0.370
Male	1.21 (0.58, 2.53)		1.69 (0.54,5.35)	
Marital status				
Single	1	0.001	1	0.001
Married	8.04 (3.62, 17.83)		7.16 (2.61,16.63)	
Education				
High school	1	0.001	1	0.001
College	0.16 (0.08, 0.35)		0.07 (0.02,0.27)	
Occupation				
Unemployed	1		1	
Self-employed	0.99 (0.28,3.48)	0.989	0.44 (0.07,2.78)	0.385
Employee	0.77 (0.21,2.83)	0.703	1.36 (0.19,9.48)	0.758
Residence				
Urban	1	0.274	1	0.859
Rural	1.91 (0.59, 6.06)		0.85 (0.14,5.00)	
Monthly income, in dollars				
<600	1		1	
600–1200	0.49 (0.19, 1.25)	0.137	0.97 (0.29,3.23)	0.962
>1200	0.09 (0.03, 0.26)	0.001	0.09 (0.02,0.29)	0.001

findings of previous studies (Andreani et al., 2020; Ayalew, 2017; Damle et al., 2020; Esan et al., 2018). It seems that one of the reasons for using these drugs is their availability. Another reason may be related to boosting the immune system to prevent COVID-19, which justifies the use of a variety of vitamins.

The results showed that the most important reasons for SM included boosting the immune system and treating the flu-like symptoms, which is consistent with the results of previous studies (Abdi et al., 2018; Niroomand et al., 2020). Given the importance of the immune system against COVID-19, people arbitrarily take a variety of vitamins.

The findings showed that rhinitis, weakness and fatigue were the most common clinical symptoms that led to SM. In previous studies, colds and fever have been reported as the main reasons for SM (Damle et al., 2020; Jafari et al., 2015; Niroomand et al., 2020). Due to the similarity of the symptoms of COVID-19 and the flu, people try to treat the symptoms of the flu through SM, which can be dangerous.

The prevalence of SM was higher in men than in women, which was not statistically significant. This finding is consistent with the result of Gyawali et al., (2015) but in contrast with those of some previous studies (Brandão et al., 2020; Kombaté et al., 2017).

Given the unknown nature of COVID-19 and the fear of catching the disease, the same prevalence of SM in men and women is not far-fetched.

In the present study, there was no statistically significant relationship between age and SM, which is in line with the results of some previous studies (Hoffmann et al., 2014; Pavydė et al., 2015; Quispe-Cañari et al., 2021) but in contrast with the findings of Liu et al. (2020). Since it is possible to catch COVID-19 at any age, people of all ages may seek SM. On the other hand, considering that COVID-19 has caused public fear and concern in all age groups, this finding is not far from expected.

The results showed that people with high school education self-medicated more than people with academic education, which is in line with the findings of previous studies (Flett & Heisel, 2020; Kombaté et al., 2017; Ouédraogo et al., 2015). However, this finding is not in line with the study of Carrasco-Garrido et al. (2024 Carrasco-Garrido et al., 2014). The high prevalence of SM in people with high school education may be related to high digital literacy and thus ease of access to drug information on the Internet.

In the present study, SM was almost twice more prevalent in the unemployed than the employed people, which is in line with the results of previous studies (Aminshokravi et al., 2014; Quispe-Cañari

et al., 2021; Zare et al., 2020). Since unemployed people do not have a source of income, and given the high cost of treatment, the high prevalence of SM is not unexpected in them.

The results showed that the prevalence of SM was the same in people living in the urban and rural areas. This finding is consistent with the results of some previous studies (Niroomand et al., 2020; Onchonga et al., 2020) but in contrast with the findings of Kalyani et al.'s study (Kalyani et al., 2020). Although the probability of SM was the same in the urban and rural residents in the current study, the prevalence of SM among them was expected to be higher due to the difficulty of rural residents' access to medical services.

The results showed that the married participants practised SM approximately 8 times more than the single ones, which was statistically significant. This finding is consistent with the results of some previous studies (Abdi et al., 2018; Onchonga et al., 2020). Married people seem to be more sensitive to their health status due to family responsibilities, although SM can be risky.

In the present study, a statistically significant relationship was found between monthly income and SM. People earning $ 600 a month were more likely to self-medicate than those earning more than $ 600, which is consistent with the results of previous studies (Nandita et al., 2021; Quispe-Cañari et al., 2021) but in contrast with the results of Bertoldi et al., (2014). Given the high cost of health care, the high prevalence of SM in low-income individuals is not far from expectations.

4.1 | Limitation

In the present study, data were collected by the self-report method, which may have affected the accuracy of the results. On the other hand, due to the nature of cross-sectional studies, it was not possible to explain the cause-and-effect relationships between variables. Further, the sampling method was non-random, which may have affected the results of the study.

5 | CONCLUSION

In the present study, the prevalence of SM was 69.4%. The most common reasons for SM included boosting the immune system and preventing COVID-19 and influenza. Vitamins, corticosteroids and antibiotics were the most commonly used drugs. The most common symptoms that led to SM were weakness and fatigue, rhinitis, sore throat and headache. There was a statistically significant relationship between SM and marriage, and education and monthly income variables. Given the high prevalence of SM and the risks associated with it, it is necessary for healthcare providers to take stricter actions against pharmacies that sell drugs without a prescription. Also, nurses, as those who are responsible for the health of the people in society, have an important role in increasing their awareness of the dangers of self-medication. It is recommended that people be informed about the consequences of SM through mass media. Future

qualitative studies are also suggested to investigate the reasons for SM for the prevention of COVID-19.

HUMAN AND ANIMAL RIGHTS

All the procedures were followed in accordance with Declaration of Helsinki.

CONSENT FOR PUBLICATION

The objectives of the study were stated for all study samples, and their characteristics and answers were kept confidential. Written and informed consent was obtained from all participants.

ORCID

Maryam Janatolmakan https://orcid.org/0000-0003-1450-1554
Alireza Khatony https://orcid.org/0000-0003-3552-5539

REFERENCES

Abdi, A., Faraji, A., Dehghan, F., & Khatony, A. (2018). Prevalence of self-medication practice among health sciences students in Kermanshah, Iran. *BMC Pharmacology and Toxicology*, *19*(1), 1–7.

Aminshokravi, F., Tavafian, S., & Moayeri, A. (2014). Assessing related factors on the illicit use of medications in Abbas Abad City (Mazandaran): A cross sectional study. *Scientific Journal of Ilam University of Medical Sciences*, *22*(5), 11–19.

Andreani, J., Le Bideau, M., Duflot, I., Jardot, P., Rolland, C., Boxberger, M., Wurtz, N., Rolain, J.-M., Colson, P., & La Scola, B. (2020). In vitro testing of combined hydroxychloroquine and azithromycin on SARS-CoV-2 shows synergistic effect. *Microbial Pathogenesis*, *145*, 104228.

Ayalew, M. B. (2017). Self-medication practice in Ethiopia: A systematic review. *Patient Preference and Adherence*, *11*, 401–413.

Behroozpour, A., Shams, M., Mousavi, M., Ostovar, R., & Maleki, M. (2016). Self-medication among women in Yasouj City and factors associated with it: A preliminary study for designing an intervention based on health belief model. *Journal of School of Public Health and Institute of Public Health Research*, *14*(3), 97–108.

Bertoldi, A. D., Camargo, A. L., Silveira, M. P. T., Menezes, A. M., Assunção, M. C. F., Gonçalves, H., & Hallal, P. C. (2014). Self-medication among adolescents aged 18 years: The 1993 Pelotas (Brazil) birth cohort study. *Journal of Adolescent Health*, *55*(2), 175–181.

Brandão, G. R., Teixeira, L., Araújo, L., Paúl, C., & Ribeiro, O. (2020). Self-medication in older European adults: Prevalence and predictive factors. *Archives of Gerontology and Geriatrics*, *91*, 104189.

Carrasco-Garrido, P., de Andrés, A. L., Barrera, V. H., Jiménez-Trujillo, I., Fernandez-de-Las-Peñas, C., Palacios-Ceña, D., García-Gómez-Heras, S., & Jiménez-García, R. (2014). Predictive factors of self-medicated analgesic use in Spanish adults: A cross-sectional national study. *BMC Pharmacology and Toxicology*, *15*(1), 1–9.

Cecyli, C., & Pragathi, T. (2020). Assessment of knowledge and practice of self-medication among urban and rural population. *Drug Invention Today*, *13*(6), 1059–1064.

Cuschieri, S. (2019). The STROBE guidelines. *Saudi Journal of Anaesthesia*, *13*(Suppl 1), S31–S34.

Damle, B., Vourvahis, M., Wang, E., Leaney, J., & Corrigan, B. (2020). Clinical pharmacology perspectives on the antiviral activity of azithromycin and use in COVID-19. *Clinical Pharmacology & Therapeutics*, *108*(2), 201–211.

Esan, D. T., Fasoro, A. A., Odesanya, O. E., Esan, T. O., Ojo, E. F., & Faeji, C. O. (2018). Assessment of self-medication practices and its associated factors among undergraduates of a private university in Nigeria. *Journal of Environmental and Public Health*, *2018*, 5439079.

Flett, G. L., & Heisel, M. J. (2020). Aging and feeling valued versus expendable during the COVID-19 pandemic and beyond: A review and commentary of why mattering is fundamental to the health and well-being of older adults. *International Journal of Mental Health and Addiction*, *19*(6), 2443–2469.

Gyawali, S., Shankar, P. R., Poudel, P. P., & Saha, A. (2015). Knowledge, attitude and practice of self-medication among basic science undergraduate medical students in a medical school in western Nepal. *Journal of Clinical and Diagnostic Research: JCDR*, *9*(12), FC17–FC22.

Hoffmann, K., Ristl, R., Heschl, L., Stelzer, D., & Maier, M. (2014). Antibiotics and their effects: What do patients know and what is their source of information? *The European Journal of Public Health*, *24*(3), 502–507.

Jafari, F., Khatony, A., & Rahmani, E. (2015). Prevalence of self-medication among the elderly in Kermanshah-Iran. *Global Journal of Health Science*, *7*(2), 360–365.

Jalilian, F., Hazavehei, S. M. M., Vahidinia, A. A., Moghimbeigi, A., Zinat Motlagh, F., & Mirzaei Alavijeh, M. (2013). Study of causes of self-medication among Hamadan Province pharmacies visitors. *Avicenna Journal of Clinical Medicine*, *20*(2), 160–166.

Janatolmakan, M., Ganji, M. R., Ahmadi-Jouybari, T., Rezaeian, S., Ghowsi, M., & Khatony, A. (2022). Demographic, clinical, and laboratory findings of mushroom-poisoned patients in Kermanshah province, west of Iran. *BMC Pharmacology and Toxicology*, *23*(1), 1–7.

Kalyani, V., Bisht, M., Thapliyal, S., & Rohilla, K. K. (2020). Comparison of practice and attitude of self-treatment in rural and urban population in Uttarakhand, India: A comparative study. *National Journal of Physiology, Pharmacy and Pharmacology*, *10*(12), 1052–1059.

Kombaté, K., Técléssou, J. N., Saka, B., Akakpo, A. S., Tchangai, K. O., Mouhari-Toure, A., Mahamadou, G., Gnassingbé, W., Abilogun-Chokki, A., & Pitché, P. (2017). Prevalence and factors associated with self-medication in dermatology in Togo. *Dermatology Research and Practice*, *2017*, 7521831.

Kumar, S., Choudhary, H., Vatsa, R., & Bhowmick, D. (2021). Practices of self-medication of dental pain in the general population of India. *International Journal of Health and Clinical Research*, *4*(4), 206–208.

Liu, K., Chen, Y., Lin, R., & Han, K. (2020). Clinical features of COVID-19 in elderly patients: A comparison with young and middle-aged patients. *Journal of Infection*, *80*(6), e14–e18.

Mudenda, S., Witika, B. A., Sadiq, M. J., Banda, M., Mfune, R. L., Daka, V., Kalui, D., Phiri, M. N., Kasanga, M., & Mudenda, F. (2020). Self-medication and its consequences during & after the coronavirus disease 2019 (COVID-19) pandemic: A global health problem. *European Journal of Environment and Public Health*, *5*(1), em0066.

Nandita, R., Priya, J., Devi, G., & Arivarasu, L. (2021). Awareness of self-medication practices among dental undergraduate students. *Annals of the Romanian Society for Cell Biology*, *25*, 2665–2674.

Nasir, M., Chowdhury, A., & Zahan, T. (2020). Self-medication during COVID-19 outbreak: A cross sectional online survey in Dhaka city. *International Journal of Basic and Clinical Pharmacology*, *9*(9), 1325–1330.

Niroomand, N., Bayati, M., Seif, M., Delavari, S., & Delavari, S. (2020). Self-medication pattern and prevalence among Iranian medical sciences students. *Current Drug Safety*, *15*(1), 45–52.

Okunola, O. A. (2020). Patterns of self-medication practices by caregivers to under-five children in South-Western Nigeria. *Child Care in Practice*, 1–11. https://doi.org/10.1080/13575279.2020.1845121

Onchonga, D., Omwoyo, J., & Nyamamba, D. (2020). Assessing the prevalence of self-medication among healthcare workers before and during the 2019 SARS-CoV-2 (COVID-19) pandemic in Kenya. *Saudi Pharmaceutical Journal*, *28*(10), 1149–1154.

Osaigbovo, I. I., Ogboghodo, E. O., Obaseki, D. E., Akoria, O., Ehinze, E. S., Obarisiagbon, O. E., & Okwara, O. H. N. (2021). Pattern of drug sales at community pharmacies in Edo state as evidence of self-medication during the COVID-19 pandemic: Implications for policy implementation. *The Nigerian Health Journal*, *20*(4), 150–158.

Ouédraogo, D.-D., Zabsonré, J. W., Tiendrebeogo, E. Z., Kakpovi, K. G., Kaboré, F., Drabo, J. Y., & Guissou, I. P. (2015). Prevalence and factors associated with self-medication in rheumatology in sub-Saharan Africa. *European Journal of Rheumatology*, *2*(2), 52–56.

Pakpour, A. H., & Griffiths, M. D. (2020). The fear of COVID-19 and its role in preventive behaviors. *Journal of Concurrent Disorders*, *2*(1), 58–63.

Pavydė, E., Veikutis, V., Mačiulienė, A., Mačiulis, V., Petrikonis, K., & Stankevičius, E. (2015). Public knowledge, beliefs and behavior on antibiotic use and self-medication in Lithuania. *International Journal of Environmental Research and Public Health*, *12*(6), 7002–7016.

Quispe-Cañari, J. F., Fidel-Rosales, E., Manrique, D., Mascaró-Zan, J., Huamán-Castillón, K. M., Chamorro–Espinoza, S. E., Garayar–Peceros, H., Ponce–López, V. L., Sifuentes-Rosales, J., & Alvarez-Risco, A. (2021). Self-medication practices during the COVID-19 pandemic among the adult population in Peru: A cross-sectional survey. *Saudi Pharmaceutical Journal*, *29*(1), 1–11.

Rezaei Jaberee, S., Aghamolaei, T., Mohseni, S., Eslami, H., & Hassani, L. (2020). Adopting self-medication prevention behaviors according to health belief model constructs. *Hormozgan Medical Journal*, *24*(1), e94791.

Román, B. R., Moscoso, S., Chung, S. A., Terceros, B. L., Álvarez-Risco, A., & Yáñez, J. A. (2020). Tratamiento de la COVID-19 en Perú y Bolivia y los riesgos de la automedicación. *Revista Cubana de Farmacia*, *53*(2), 1–20. http://www.revfarmacia.sld.cu/index.php/far/article/view/435/310

Ruiz-Aquino, M., Carlos Trinidad, V. G., Alvarez-Risco, A., & Yanez, J. A. (2022). Properties of a scale of self-care behaviors facing COVID-19: An exploratory analysis in a sample of university students in Huanuco, Peru. *International Journal of Mental Health Promotion*, *24*(6), 959–974.

Sahin, A.-R., Erdogan, A., Agaoglu, P. M., Dineri, Y., Cakirci, A.-Y., Senel, M.-E., Okyay, R.-A., & Tasdogan, A.-M. (2020). 2019 novel coronavirus (COVID-19) outbreak: A review of the current literature. *EJMO*, *4*(1), 1–7.

Yan, J., Kim, S., Zhang, S. X., Foo, M. D., Alvarez-Risco, A., Del-Aguila-Arcentales, S., & Yáñez, J. A. (2021). Hospitality workers' COVID-19 risk perception and depression: A contingent model based on transactional theory of stress model. *International Journal of Hospitality Management*, *95*, 102935.

Yáñez, J. A., Jahanshahi, A. A., Alvarez-Risco, A., Li, J., & Zhang, S. X. (2020). Anxiety, distress, and turnover intention of healthcare workers in Peru by their distance to the epicenter during the

COVID-19 crisis. *The American Journal of Tropical Medicine and Hygiene*, 103(4), 1614–1620.

Zare, A., Pourmontaseri, Z., & Sharafi, M. (2020). Prevalence and factors associated with self-medication in Fasa in 2018: Community-based cross-sectional study. *Journal of Fasa University of Medical Sciences*, 10(2), 2285–2293.

Zhang, X., Zhou, S., Zhou, Y., & Liu, X. (2018). Research progress in inappropriate drug use in the elderly. *Chinese Journal of Geriatrics*, 37(4), 479–484.